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NEW TYPES OF SOVIET MACHINE TOOLS PRODUCED IN 1949 - 1950

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UNIVERSAL MACHINE TOOLS

In June 1949, the Krasnyy proletariy Plant converted production of the Model 1A62 screw-cutting lathe to conveyer methods This model is a modernized version of the DiP-200.

Parts having a diameter of 100 millimeters can be machined on this lathe at a speed of 360 meters per minute and parts having larger diameters at even higher speeds. Modern improvements making work at high speeds possible and providing greater convenience of speed control have been incorporated into the design of this machine. A dial on the apron indicates the length of work machined. Previously, this was measured by a worker with a rule which necessitated machine-tool stoppage.

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In 1949, the Krasnyy proletariy Plant built experimental models and at present is producing in series the highly universal, powerful, high-speed Model 1620 screw-cutting lathe of original Soviet design. The lathe has a stepless adjustment of spindle speeds ranging from 18 to 3,000 revolutions per minute. It can machine 100-millimeter diameter parts at a speed of up to 900 meters per minute. The levers are few in number and push buttons are conveniently located for machine-tool control. This machine, in its operational qualities, excels all known screw-cutting lathes of its size produced by Soviet plants or foreign firms.

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The Middle Volga (Srednevolzhskiy) Machine-Tool Building Plant has begun series production of the new Model 1616, 160-millimeter-swing screw-cutting lathe, the spindle speeds and capacity of which are double those of Model 1615M. Parts having an 80-millimeter diameter can be machined at a speed of up to 500 meters per minute. Machine-tool control is exceptional for its simplicity and convenience.

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The Gor'kiy Milling Machine Plant has undertaken production of five new models of knee-type milling machines: 6N82 universal, 6N82G horizontal, 6N12 vertical, 6N83G horizontal and 6N13 vertical. The milling speed on these machines reaches 600 meters per minute and higher.

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The Odessa Radial Drilling-Machine Plant has undertaken series production of a new heavy-duty radial drilling machine, Model 257, for drilling up to 75-millimeter-diameter holes. The speeds and feeds of this machine are controlled hydraulically by means of a hand lever. It is provided with automatic feed disengagement when drilling to a specified depth.

The Leningrad Plant imeni Sverdlov has manufactured an experimental model of a horizontal boring machine with a 125-millimeter spindle diameter. A photograph of this machine appears on the cover of Vestnik mashinostroyeniya, No 6, 1950. [Identified as Model 2631 in the issue cited.

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It is exceptional for its rigidity, vibration resistance, high precision, and high finishing properties. There are no hand wheels on the machine; all controls are by push button.

In addition to increased productivity, these universal machine tools have been designed with principles of accident prevention and improved working conditions in mind.

SPECIAL AND COMBINATION MACHINE TOOLS AND AUTOMATIC TRANSFER LINES

The Krasnyy proletariy Plant has begun production of a series of special high-speed lathes for chuck or center work. These include Models MK-163, MK-164, MK-167, MK-182, and MK-185. These machines are designed for high-speed cutting, exceeding 1,600 meters per minute; they are at least four times more productive than previous models.

This plant has also begun production of a unique heavy machine tool, Model 9801, weighing 35 tons, for finish and semifinish turning of up to 450-millimeter-diameter crankpins and webs on 5,000-millimeter-long crankshafts. The oval and tapered parts of the shaft webs can be machined to a tolerance of 0.005-0.015 millimeter.

For the first time in the Soviet Union, the Krasnyy proletariy Plant has put into production a two-position hydraulic multicutter semiautomatic, Model 1841, weighing 32 tons, intended for simultaneous machining of all crankpins on two automobile crankshafts. It machines to high precision and is twice as productive as the existing models at automobile and tractor plants. The only operations which the operator must perform are installation and removal of the work and starting the machine.

This plant has also put in production an original high-duty thread-milling automatic, Model MK-191, for simultaneous hole and face milling and threading of two ends of a graphite electrode having a 225-500 millimeter diameter and 1,500-millimeter length. The machining cycle, loading, and unloading are completely automatic. All friction surfaces of the machine are hermetically sealed; the

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cutting process is carried out in special housings from which the graphite dust is removed through an exhaust device. This assures sanitary and hygienic work conditions and long life of the automatic's mechanisms.

The Leningrad Plant imeni Sverdlov is now producing a heavy universal four-spindle horizontal boring machine, Model LR-10, weighing 175 tons, for simultaneous high-speed bilateral boring of piston and valve holes in locomotive cylinders, and turning the ends adjacent to the holes. Its high rigidity and vibration resistance makes machining at a rate of up to 400 meters per minute possible, which, in comparison with similar machines of foreign firms, gives a productivity of eight to ten times greater. The design of the machine eliminates the use of interchangeable boring bars, which considerably eases the work of the operator and shortens the time required for auxiliary operations.

This plant has also undertaken production of a two-spindle LR-15 machine for boring and undercutting the faces for crank pins on locomotive wheel pairs. In comparison with analogous machine tools of foreign firms, the productivity of the new machine, which is up to ten wheel pairs per shift, is four to eight times as great, while the requirements for operating personnel are only half as great.

During recent years, the field for using combination machine tools has broadened considerably. Where earlier they were manufactured mainly for the automobile and tractor industry, at present, a large number of them are being built for agricultural machine-building, the electrical industry, and other plants.

The Plant imeni Ordzhonikidze has manufactured machine tools for straight-line production of reaper frames and mower frames for the Lyubertsy Agricultural-Machine Building Plant. One machine, Model 1A285, operating in a line for machining mower frames, bores two holes having a diameter of 61.4 millimeters and drills six holes having a diameter of 6.7-11 millimeters. Its productivity is 20 frames per hour.

Milling machines are now being manufactured from standard units. A large number of these milling machines have been built especially for the Automobile Plant imeni Stalin such as the Model 1A319 for milling front axles for the ZIS-150 truck.

The automatic transfer machine-tool line, 1A58-1A78, designed by the SKB-1 /Machine-Tool Design Bureau No 1/ and manufactured by the Stankokonstruktsiya Plant, is intended for machining Diesel cylinder blocks at the Yaroslavl' Automobile Plant. It performs the following operations: drilling, counterboring, removing chamfered edges, and cutting threads in the upper and lower surfaces of the cylinder block on the supercharger side. The blocks are transferred from one position to another by means of a bar actuated by a hydraulic cylinder.

When the work is transferred from one section of the line to the next, it is automatically turned, fixed, and locked in all working positions by pneumatic-hydraulic power.

The line consists of 22 machine tools with a total of 351 simultaneously operating spindles and 38 electric motors having a total power of 113 kilowatts. Four workers service the line; its productivity is 20 blocks per hour. If these blocks were machined on universal machine tools, 24 skilled workers would be required.

The 1A443-1A448 automatic transfer machine-tool line, designed by the SKB-1 and manufactured by the Moscow Plant imeni Ordzhonikidze, is intended for drilling, removing chamfered edges, facing bosses, boring, reaming, and cutting threads in oblique holes under the distributor and oil pump in the four-cylinder automobile engine block.

The line consists of six double-sided sloping machine tools with two-position attachments and a total of 60 spindles. The 22 electric motors have a total power of 50.8 kilowatts. The line is equipped with attachments for automatically controlling the depth of holes, a special automatic device for servolubrication of taps, and a chip removal mechanism and conveyer.

Compressed air is used for cleaning chips from holes. The line is controlled automatically by a servomechanism. The central control panel is provided with a device for rapid detection of incipient trouble spots.

Labor consumption in machining a block on the line is 18 times less than on universal machines, and five times less than on combination machine tools.

An example of the highly automatic productive process is the automatic plant which was developed by scientific organizations and plants of the Ministry of Machine-Tool Building for manufacturing aluminum pistons for the ZIS-150 and GAZ-MM. At this plant, the entire work cycle is automatic, beginning with the casting and ending with the packing of completed pistons. All deviations from the specified work regime are noted by signals. It is the duty of the servicing personnel to remedy defects and take preventive measures as a precaution against breakdown of the units.

This work is done outside of working hours, and on the third shift.

TOOL AND ABRASIVE PRODUCTION

The experience of innovators in high-speed machining and the development of machine tools for working at high speeds has pushed to the fore the need for developing a full range of tool types and expanding hard-alloy tool production.

The range of types of hard alloy tools such as drills, counterbores, reamers, facing disks and end mills increased 2.5 times in 1949 as compared with 1948.

Series production has begun on (a) large-module sectional hobs, Grade A hobs, precision-made milling cutters for precision machine building; hobs, gear cutters, and shavers of 0.3-1 millimeter module for instrument building; (b) threading and boring tools for machining pipes up to 16 inches in diameter, and 3KA and 4KA threading dies for automatics.

A number of measuring-tool plants are now series producing complex checking automatics for piston rings and ball bearings, electric multimeasuring instruments of the signal-light type, two-tube air gauges, instruments for checking play in small-module gears with minimeters of new design, and checking-and-sorting automatics.

Achievements in abrasive production have made possible the cessation of imports of abrasive tools. During 1949, Soviet industry received 94 new types of improved-quality abrasive tools from the domestic abrasive industry.

The industrial application of the VNIIASh (All-Union Scientific Research Institute for Abrasives and Grinding) technology in the production of special abrasive tools for truing grinding wheels is important. Plants of the Main Administration of the Abrasives Industry have developed an abrasive material called monocorundum which replaces diamonds. This new material has increased labor productivity 25-35 percent.

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NEW TECHNOLOGY

The Moscow Krasnyy proletariy Plant's DiP-200 lathe and the Middle Volga Plant's 1615 lathe were the first in world machine-tool building to be manufactured on a straight-line conveyer basis. Without stopping the production of the DiP-200 lathe, the Krasnyy proletariy Plant converted to conveyer production of its modernized 1A62 high-speed lathe, while the Middle Volga Plant converted to production of the 1615M lathe.

At present, more than 90 percent of lathes having a 320-400 millimeter swing are produced by conveyer methods at plants of the Ministry of Machine-Tool Building USSR. As a result, labor consumption for the manufacture of machine tools has decreased 25-30 percent and production has increased 40-50 percent.

The Soviet tool industry was also the first in the world to set up assembly conveyer and machining conveyer production of micrometers and slide rules (Kalibr Plant), dies and taps (Frezer, Sestroretsk, and other plants) and segments for circular saws (Kirzhach Plant).

At abrasive plants, conveyer lines have been put into operation for the production of bakelite-bond grinding wheels. Labor consumption is cut 15 percent.

FUTURE MODELS

A number of precision machine tools must be developed in the near future. The fulfillment of this assignment will require a concerted effort on the part of all machine-tool building personnel.

The number of types of gear-machining machine tools must be increased. New models are needed for precision machine building and heavy machine building. Machine tools for cutting gears having globoid meshing must be put into production.

Heavy boring machines must also be developed.

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